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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,350	01/27/2006	Tetsuro Tateishi	KUZ0028USNP	2515

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EXAMINER	
PURDY, KYLE A	

ART UNIT	PAPER NUMBER
4173	

NOTIFICATION DATE	DELIVERY MODE
12/11/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

poreilly@licataandtyrrell.com

Office Action Summary	Application No.	Applicant(s)	
	10/566,350	TATEISHI ET AL.	
	Examiner	Art Unit	
	Kyle A. Purdy	4173	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/27/2006; 10/22/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. The Examiner acknowledges receipt of the amendment filed on October 2007 wherein claim 2 is amended; claim 10 is cancelled; and claims 13-19 are added.

2. The Examiner is withdrawing the previous grounds of rejection in place of the following new grounds of rejections. The following rejections are made

New Grounds of Rejections

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claim 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

5. Claim 15 recites the limitation "wherein the (meth)acrylic ester constituting the acrylic polymer is 2-ethylhexyl acrylate" in lines 2 and 3 of the claim. There is insufficient antecedent basis for this limitation in the claim because Claim 15 lacks antecedent basis as claim 7 is directed to absorption promoters rather than the (meth)acrylic ester monomer of the acrylic polymer. Applicant may overcome rejection by amending instant claim 15 to depend from claim 1.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. **Claims 1-9 and 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Modamio et al. (International Journal of Pharmaceutics, 1998, 173, 141-148; of record) in view of Hirano et al. (US 6495159; of record) and Higo et al. (US 5866157; of record), further evidenced by Walters (Transdermal Drug Delivery, 1989, New York, NY, pp. 197-246).**

8. The instant claims are drawn to an adhesive patch wherein the acrylic polymer further comprises copolymerized butyl acrylate as the (meth)acrylic ester constituent of the copolymer wherein the acrylic copolymer is a 2-ethylhexyl acrylate-butyl acrylate-acrylic acid copolymer, wherein the penetration rate of bisoprolol through the skin is 4.0-300 $\mu g/hr/cm^2$.

9. Modamio et al. ('Modamio) teaches a bisoprolol containing transdermal patch. It is taught that bisoprolol is a beta-blocker, and that research is underway to develop transdermal patches for the efficient delivery of beta-blockers such as bisoprolol (and celiprolol) for patients who cannot take medicines by themselves or when oral administration of such drugs may be inadvisable due to unpleasant side effects (see page 142, column 1, 1st paragraph). It is taught that the patch of possesses a surface area of 16 cm^2 (see page 144, column 2, 3rd paragraph) wherein the patch possesses a penetration rate of 1.19±060 $\mu g/hr/cm^2$ (see abstract). It is noted that the penetration rate approaches 3.0 $\mu g/hr/cm^2$ when taking into account three standard

deviations. Modamios' experiments indicate that bisoprolol has a difficult time crossing the skin barrier, and the theoretical plasma concentration provided by the system is well below bisoprolols therapeutic concentration (see abstract). It is stated that in order to for the bisoprolol containing patch to be therapeutically effective, transdermal absorption enhancers are required to improve bisoprolols diffusion across human skin (see abstract and page 147, first column, third paragraph). Modamio incorporates by reference the teaching of Walters to illustrate typical absorption enhancers which include solvents like water and lower alcohols, surfactants such as fatty acids and fatty alcohols, and other chemicals such as urea (see pages 203-227).

10. Modamo fails to teach the patch that possesses a pressure-sensitive adhesive layer, wherein the adhesive layer contains an acrylic polymer obtained by copolymerizing a meth(acrylic ester with a (meth)acrylic acid comprising a carboxyl group such as that of 2-ethylhexyl acrylate-butyl acrylate-acrylic acid copolymer. The teaching of Modamio fails to teach the rate of penetration of bisoprolol through the skin as 4.0-300 $\mu g/hr/cm^2$. Modamio also fails to specifically teach the absorption promoters as being for example, lauryl alcohol, an organic acid or isopropyl myristate.

11. Hirano ('159) is drawn to a percutaneous treatment device that possesses a pressure-sensitive adhesive acrylic polymer layer that allows for the controlled release of a medicine (see column 1, lines 9-10). The acrylic adhesive taught by '159 may be a copolymer of (meth)acrylic acid alkyl ester monomers and other functional monomers (see column 6, lines 25-31). The (meth)acrylic acid alkyl ester monomers include butyl acrylate, 2-ethylhexyl acrylate, and 2-ethylhexyl methacrylate. The functional monomer is said to be a monomer having a carboxylic acid such as acrylic acid, methacrylic acid (see column 6, lines 47-51). Furthermore, it is taught

in Example 1 and 2 that vinyl acetate may be implemented as a monomer in the copolymer. For example, it is present in the copolymer of 2-ethylhexyl acrylate/ethylacrylate-vinyl acetate copolymer (see Example 2). Moreover, the idea of combining an acrylic copolymer with an elastomeric polymer is expressly taught at column 5, lines 43 to line 6 column 3. Specifically, '159 discloses the use of polyisobutylene (available from Exxon chemical as trade name "Vistanex") and styrene-isoprene-styrene copolymer (available from Japan Synthetic Rubber Co. as "JSR 5000"). The reference also teaches the use of aliphatic acids, aliphatic alcohols and esters of aliphatic acids having 7-20 carbon atoms (see column 4, lines 42-56). Some specific examples of disclosed absorption promoters include lauryl and myristyl alcohol.

12. The teaching of Higo et al. ('157) is drawn to a patch formulation which comprises an adhesive layer containing a physiological active substance, an organic acid, a hydrophobic material, a tackifying resin, a plasticizer and an absorption enhancer (see abstract). The absorption enhancers (and organic acids) are included in the formulations taught by '157 in order to allow for sufficient uptake of physiological active material from the skin by improving the transdermal mobility for said active substances (see column 1, lines 35-40). Absorption enhancers taught by '157 include organic acids such as lactic acid (see column 2, lines 62-66 and column 3, lines 12-19) as well as the absorption enhancer isopropyl myristate (see column 5, line 11).

13. Thus, it would have been obvious to one of ordinary skill, at the time the invention was made to combine the references of Modamio with those of '159 and '157 because in doing so would result in a transdermal patch that would possess improved adhesive properties while allowing for the modulated release (and improved absorption properties) of the active substance,

bisoprolol. The significance of Modamio is that the reference describes a transdermal patch for the delivery of bisoprolol wherein bisoprolol has a penetration rate of 1.19±060 μg/hr/cm^2 across the skin. Albeit this value is below the instantly claimed rates, Modiamo teaches that this rate could be increased by adding absorption enhancers. The notion of implementing an acrylic adhesive layer for the delivery of bisoprolol is obvious because one would want the patch to be capable of effectively adhering to the skin for constant delivery of the substance. The teaching of '159 teaches an array of monomers to be used in the synthesis of homo- and co-polymers which include butyl acrylate, 2-ethylhexyl acrylate, acrylic acid and vinyl acetate. It would have been obvious to copolymerize these monomers as it stated by '159 that the adhesive copolymer preferably contains monomers having the aforementioned chemical names. Additionally, the copolymer of 2-ethylhexyl acrylate/ethylacrylate-vinyl acetate is taught in Example 2. As the ethyl acrylate of the copolymer is different from butyl acrylate by one carbon, one would expect similar properties between the two acrylic adhesives. The transdermal absorption promoters of the patches taught by '159 and '157 include absorption enhancers such as lauryl alcohol, lactic acid and isopropyl. It is taught by '157 that these agents are useful because they promote transdermal delivery of active agents that possess a low diffusion constant for crossing the epidermal barrier. It would be obvious to one of skill in the art to include such absorption enhancers as they would necessarily increase the rate of bisoprolol across the skin, resulting in a higher plasma concentration resulting in improved action. Moreover, as all of the references relied upon are within the same field of endeavor (i.e. transdermal delivery of active agents), it would have been obvious to one of ordinary skill in the art to combine them and arrive at a final product with the properties instantly claimed. Therefore, it would have been obvious to one

skilled in the art to combine the teachings of Modamio with '159 and '157 with a reasonable expectation of success.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle A. Purdy whose telephone number is 571-270-3504. The examiner can normally be reached from 9AM to 5PM.

15. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisors, Ardin Marschel and Cecilia Tsang, can be reached on 571-272-0718 or 571-272-0562, respectively. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Kyle A. Purdy/
Examiner, Art Unit 4173

/Ardin H Marschel/

Supervisory Patent Examiner, Art Unit 1614